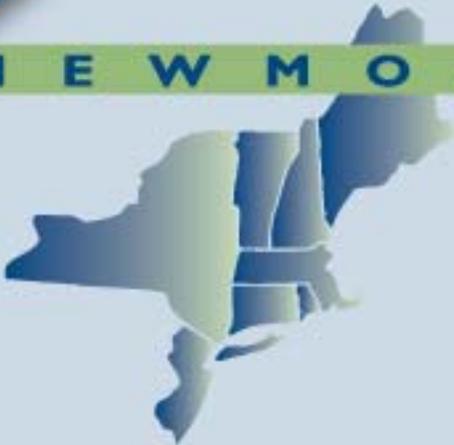


Energy & Materials Flow & Cost Tracker (EMFACT)

Terri Goldberg
Northeast Waste
Management
Officials' Association

N E W M O A



Overview

- Background
- Purpose & Scope
- Development Process
- Big Picture
- Example
- Features
- Status

EMFACT Objectives

To assist **small & medium-sized businesses** in the U.S. to:

- Better track & understand the **use & flow of fuel, water, & materials** through their facility
- Better understand the **actual costs** of poor resource efficiency & subsequent waste management
- **Improved** business decision-making & **environmental performance**
- Implement a cycle of **continuous improvement** via continuous tracking

EMFACT Products

- An **easy-to-use, well-documented tool** to assist small & medium-sized enterprises in tracking:
 - ◆ fuel, water, & materials use
 - ◆ generation of air emissions, wastewater, & solid/hazardous waste
 - ◆ associated costs
- **User's guidance & training materials**
- Training for **technical assistance providers**
- Online **downloadable free access** to the software application & support materials

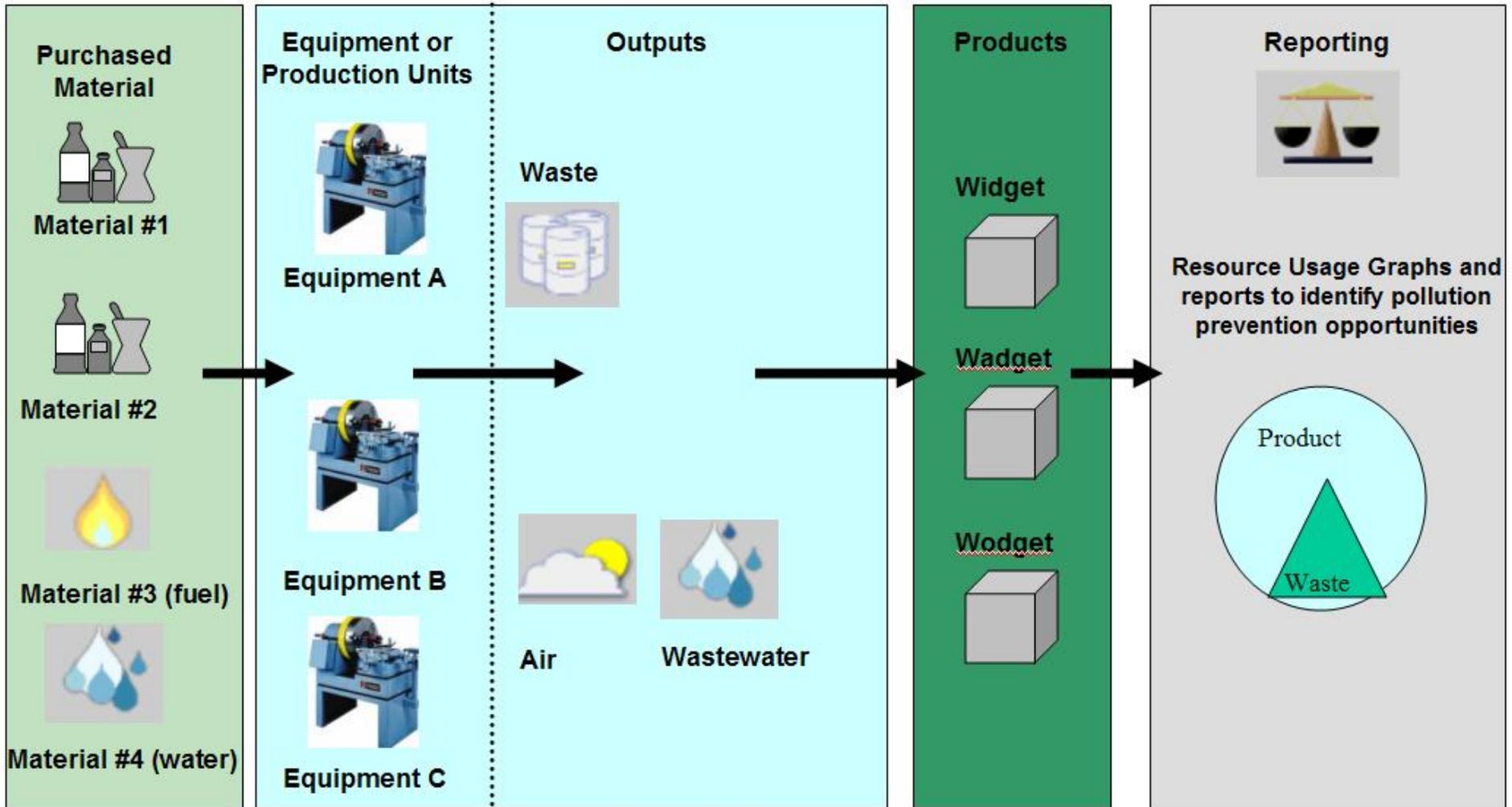
EMFACT Team

- US EPA (*funder*)
- Northwest Waste Management Officials' Association (NEWMOA)
- Massachusetts Office of Technical Assistance (Mass OTA)
- SYS Technologies
- EMARIC
- Advisory Group (includes EPA)

Development Process

- Engaged Advisory Committee, TURPAs, example companies, & NEWMOA's Board
- Developed a Draft Request for Proposals (RFP)
- Held a vendors' meeting – Comments on Draft
- Issued final RFP – Held bidder's conference
- 5 proposals submitted
- Formed review committee
- Selected SYS Technologies
- Developed contract
- Developed systems & data requirements

Data Flow



EMFACT Approach

- User has the option to **define**:
 - ◆ Organization (e.g., departments)
 - ◆ Site & buildings
 - ◆ Equipment, including waste management equipment
 - ◆ Inputs (fuel, water, materials, chemical constituents)
 - ◆ Intermediate & final products
 - ◆ Non-product outputs (air, water, waste)
- **Link** the components together
- Populate with **data**, e.g., physical quantities, costs, emission factors
- Analyze & **report**

EMFACT Dashboard

EMFACT Start Page

 **EMFACT** Energy & Materials Flow and Cost Tracker

Setup

- ToolBox Admin
- EHS Objects
- Materials
- Permits
- Product

Inputs

- Characterize
- Purchases
- Usage



Outputs

- Product
- Non-product

 - Air
 - Wastewater
 - Waste

Reminders

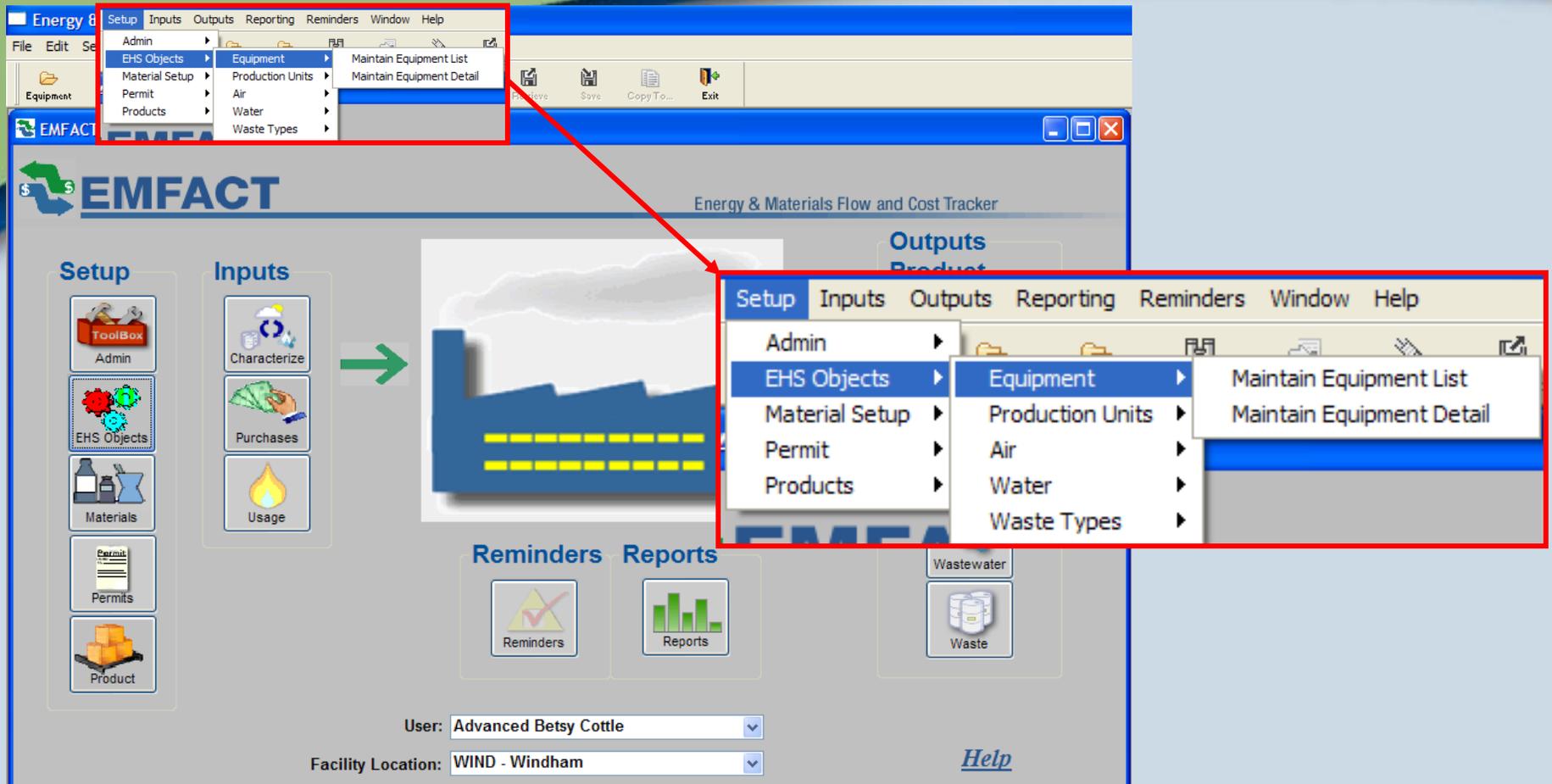
Reports

User:

Facility Location:

[Help](#)

EMFACT Navigation



Menu paths are provided for all windows.

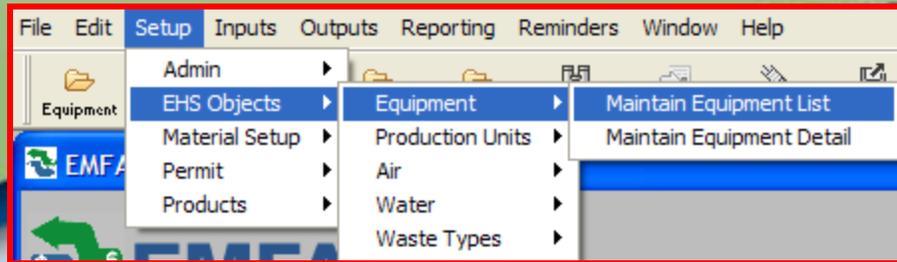
Clicking an icon, button, or menu path will open a new window for the indicated functionality.

EMFACT Example

Air Emissions from a Paint Booth



Define Process Equipment



Add Paint Booth to the Equipment List - then add details.

The 'Maintain Equipment List' window features a search area with fields for 'Find Equipment ID', 'Equipment ID', 'Building', 'Prod Unit ID', 'Description', 'Category', and 'Dept'. Below the search area is a table with the following data:

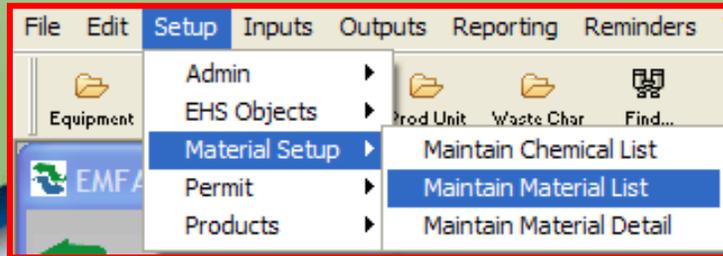
Equipment ID	Description	Building	Building Name	Location	Installation Date	Category
BOOTH #4	Paint Spray Booth #4	100	Main Building	East corner	10/15/2000	Paint Spray Booth
BOILER 1	Boiler in NW cost	100	Main Building		00/00/0000	Boilers

The 'Maintain Equipment Detail BOOTH #4' window displays the following details for the selected equipment:

- Equipment ID:** BOOTH #4
- AKA No:** [Empty]
- Status:** Active
- Description:** Paint Spray Booth #4
- Category:** Paint Spray Booth
- Building:** 100 (Main Building)
- Location:** East corner
- Dept:** OPS (Operations)
- Prod Unit ID:** [Empty]
- Update Date:** 10/16/2007
- Manufacturer:** Derrick
- Model:** CAP2
- Installation Date:** 10/15/2000
- Annual Operation Hours:** 0
- Permit/Reg. No.:** [Empty]
- File Name:** [Empty]

At the bottom, there is an 'Enable Advanced Fields' checkbox, navigation buttons, a 'Comments' button, and the identifier 'ST3/SIM813'.

Define Input Materials



Add paint to the Input Materials List - then add details.

Maintain Materials List

Filter Data

Find Material ID:

Material ID: Synonym: VOC Percent:

Material Category: Manufacturer:

Material Name: CAS:

Material ID	Material Name	Material Type	Status	Manufacturer Name	Mfr Written Date
GAS	Natural Gas	Fuel	Active		
SPECIAL PAINT	Paint specific to Booths	Paint	Active	Paintco	10/2/2006

Maintain Material DetailSPECIAL PAINT

Material ID: SPECIAL PAINT Written Date: 10/2/2006 00 Revision Date: Status: Active

Material Type: Paint Chemical Name: Paint specific to Booths

Trade Name: Paint 123A Grey

Mfr Name: Paintco Hazardous Warnings:

Density: 7.9000 VOC Percent: .00 Target Organs:

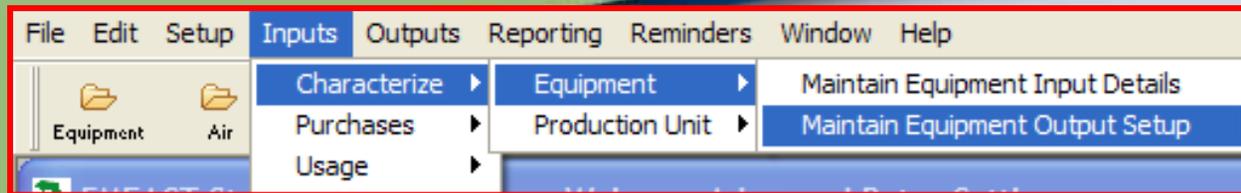
Last Update: 10/16/2007

Comments:

Constituent Synonyms Container

Chemical ID	From %	To %	Avg %	Chemical Name:	Last Update
10099-76	10	20	15	Lead Silicate	10/16/2007
1344-37-2	5	10	7.5	Chrome Yellow	10/16/2007

Define Non-product Outputs



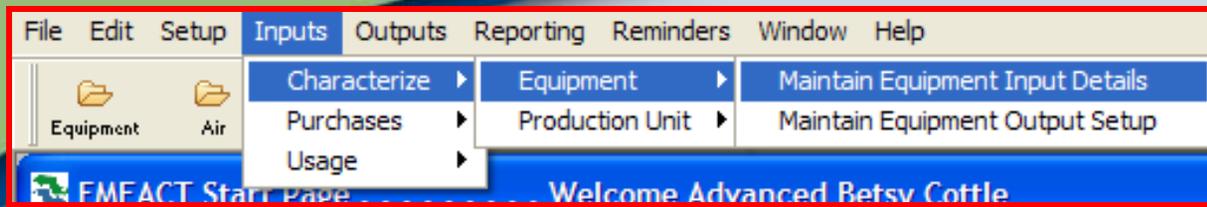
The dialog box shows the configuration for 'BOOTH #4'. The 'Equipment Id' is 'BOOTH #4' and the 'Description' is 'Paint Spray Booth #4'. The 'Building' is '100 Main Building' and the 'Location' is 'East corner'. The 'Updated' date is '10/16/2007'. The 'Source' tab is selected, and the 'Paint' sub-tab is active. The 'Source Type' is 'Paint/Spray Booth'. The 'VOC Control Efficiency %' is '80.00' and the 'TSP Control Efficiency %' is '95.00'. The 'Default Units' are 'Gallons'.

In the case of air emissions, determine emission factors for different pollutants.

The 'Paint' sub-tab is selected, showing two entries for paint-specific pollutants. Each entry includes a 'Paint' dropdown, a 'Pollutant' dropdown, 'Density', 'Pollutant Content', 'VOC Percent', and an 'Active?' checkbox.

Paint	Pollutant	Density	Pollutant Content	VOC Percent	Active?
Paint specific to Booths	TSP		1		<input checked="" type="checkbox"/>
Paint specific to Booths	VOC	7.9	5	0	<input checked="" type="checkbox"/>

Link Equipment, Inputs, & Outputs



Link the Paint Input Material to the Paint Booth Equipment.

Maintain Equipment Input Details for: BOOTH #4

Equipment Id: BOOTH #4 **Description:** Paint Spray Booth #4

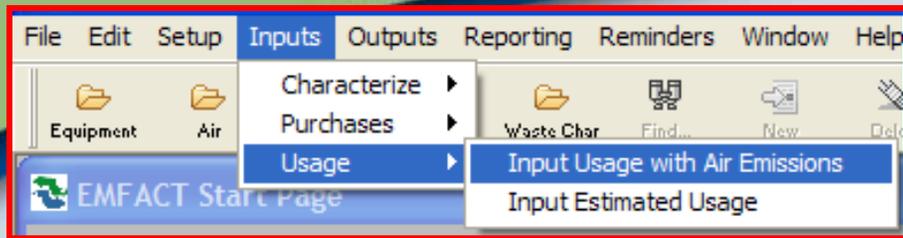
Building: 100 Main Building

Location: East corner **Updated:** 10/16/2007

Materials Air Source Discharge Waste Products

Material ID	Material Name	Material Type	Manufacturer Name	Active?
SPECIAL PAINT	Paint specific to Booths	PAINT	Paintco	<input checked="" type="checkbox"/>

Inputs – Enter Usage Data



Enter paint usage data.

The screenshot shows the 'Input Usage with Air Emissions' window. It contains several input fields and a table of existing data.

Equipment Id: BOOTH #4
Material Id: SPECIAL PAINT
Usage Date: 10/17/2007 07:00
Run Time (in Hours): 5.00
Usage Qty/Units: 20.00
Source Type: Gallons

Save Usage!

Entry Data so far...

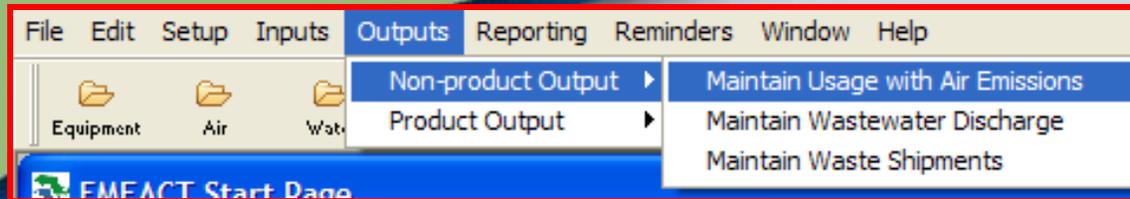
<u>Equipment Id</u>	<u>Material Id</u>	<u>Usage Date</u>	<u>Run Time (in Hours)</u>	<u>Usage Qty/Units</u>	
BOOTH #4	SPECIAL PAINT	10/16/2007 08:00	4.50	10.00	Gal

Update/View Emissions

Data per Source **Daily Recordkeeping** **Monthly Recordkeeping**

STS200

Outputs – Auto Calculated *(in this case)*



Emissions are automatically calculated in this case. Outputs will be manually entered in other cases, e.g., solid waste.

The screenshot shows the 'Maintain Usage with Air Emissions for Windham' window. The window has a blue title bar and a grey background. The 'Filter Data' section is highlighted with a blue border and contains the following fields: 'Equipment Id: BOOTH #4', 'Production Unit Id: [empty]', 'Usage Date From: 00/00/0000', and 'Usage Date To: 00/00/0000'. There is a 'Clear Filters' button. Below the filter data, the 'Equipment Id' is set to 'BOOTH #4' and the 'Source Type' is 'Paint'. The 'Material Id' is 'SPECIAL PAINT'. The main data table is as follows:

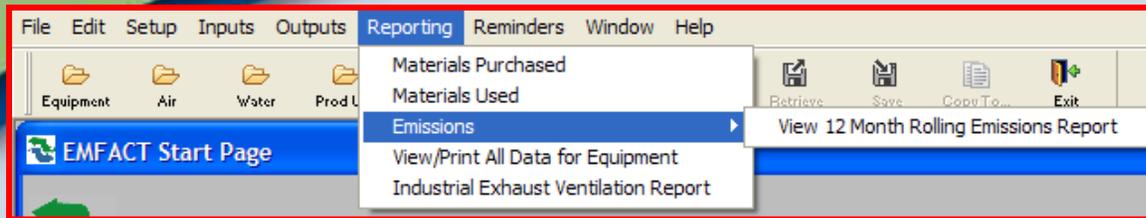
Usage Date	Run Time (in Hours)	Usage Qty/Units	
10/17/2007 07:00	5.00	20.00	Gallons

Pollutant	Emission (Lbs.)	Start Date/Time
TSP	1.03	10/17/2007 07:00
VOC	19.91	10/17/2007 07:00

At the bottom right, the 'Updated' date is '10/16/2007'.

Report

Review paint usage with computed emissions by month & 12-month rolling totals.



Paint Manager - 12 Month Emissions Summary Report

Filter Data
 Production Unit/Equipment ID: BOILER 1 From Usage Date: 01-2007 To Usage Date: 10-2007 (MM-YYYY)

10/16/2007 18:17:16 12 Month Emissions Summary Recordkeeping Page 1 of 1
 From 01-2007 To 10-2007

Site: Windham

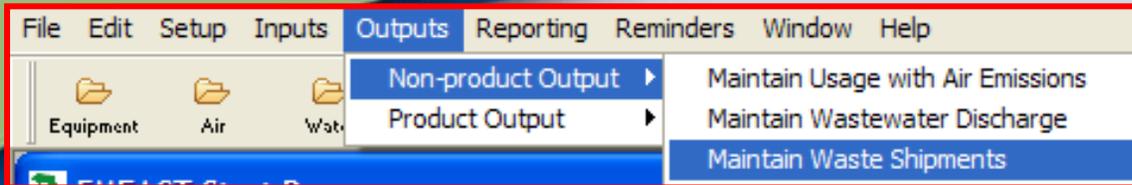
BOOTH #4 Paint Spray Booth #4

Usage Month	Current Month Totals				12 Month Running Totals			
	Hours	Usage	Pollutant	Total Emissions	Hours	Usage	Pollutant	Total Emissions
10-2007	4.50	79.0000	TSP	0.5135	0	79	TSP	0.5135
			VOC	9.9540			VOC	9.9540
Grand Total:	4.50	79.0000	TSP	0.5135			VOC	9.9540

Cost Data

- EMFACT will also allow **collection of relevant cost data**; this feature is in an early stage of development.
- **Examples** include:
 - ◆ Materials purchase costs
 - ◆ Waste management & disposal costs
 - ◆ Others

Waste Shipments & Costs



The Waste Shipment screen allocates back to the source, tracks cost data, & tracks other waste shipment information (date, manifest, vendor, etc.).

Maintain Shipment No.: 0000001

Shipment No.: 0000001 Shipment Date: 10/04/2007 Last Update: 10/16/2007

Contact Person: Liz Ostwald

Vendor Name: New Waste Vendor

State Manifest

Manifest No.: CT1234 Document No.: Returned?: # of Days Outstanding: 11

Total Weight in Lbs.: 377 Total Shipment Cost \$: 24,352.00

Waste Type	Weight in Lbs.	Internal Cost in \$	External Cost in \$	Total Cost in \$:
Cardboard	22	0.00	0.00	0.00
Equipment/Production Unit ID: 1234 Machine 2				Last Update: 10/15/2007
Oil	22	444.00	121.00	565.00
Equipment/Production Unit ID				Last Update: 10/04/2007
Scrap	333	555.00	23,232.00	23,787.00
Equipment/Production Unit ID				Last Update: 10/04/2007

Compliance Information

- A survey of potential users told us – **regulatory compliance must be a component** of EMFACT
- So, EMFACT **incorporates lists of regulated chemicals**; tool can flag & report on these chemicals:
 - ◆ SARA 313
 - ◆ Hazardous Air Pollutants (HAPs) – federal & state
 - ◆ Ozone Depleting Substances – Classes I & II
- EMFACT also provides
 - ◆ Ability for users to **create their own chemical lists**
 - ◆ Screens to list/describe **permits**
 - ◆ A **calendar with event reminders** (e.g., permit renewal)

Examples of Reminders

Search For Events

Filter Data

Event Name: Due Date: > 00/00/0000

Location: Reminder Date: > 00/00/0000

Event Status: Open Recurring? No

Dept.:

Find Event No.

Clear Filter Data

More Summary...

Display Report

Due Date	Event No.	Site Code	Event Name	Event Location	Reminder Start	Event Status	Cr
8/13/2007	0000001	WIND	Permit Expiration for: 2007-01			Open	001
09/13/2007	0000002	WIND	Permit Expiration for: 2007-01			Open	001
07/20/2008	0000003	MYC	Permit Expiration for: 2007-011			Open	001
06/20/2008	0000004	MYC	Permit Renewal Due for: 2007-011			Open	001
05/20/2008	0000005	MYC	Permit Renewal Start for: 2007-011			Open	001
12/01/2007	0000006	WIND	Permit Expiration for: ABC123			Open	002

Enable Advanced Fields Display All Sites 1 of 6 Records

PAC010

Reminder Details

Summary Maintenance For Event Number: 0000004

Event No.: 0000004 Site Code: MYC Due Date: 06/20/2008 Status: Open

Permit Renewal Due for: 2007-011 Location:

Desc:

Contact Person: 001 Liz Ostwald Last Update: 07/20/2007

Event Filename: GO

Email Reminder

Initial Reminder Date: Final Reminder Date:

Responsible Department

0

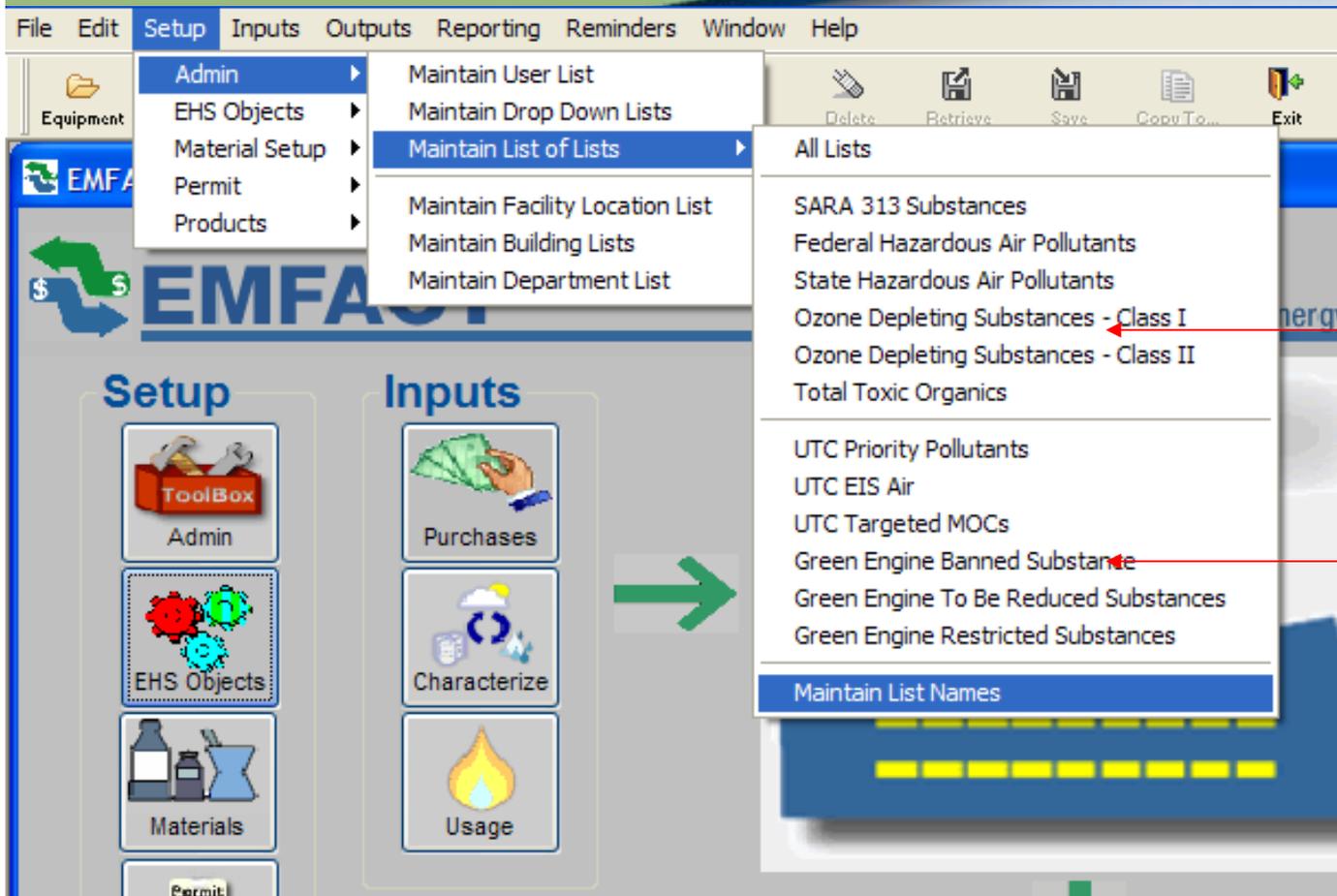
Recurring Event

Recurring? Yes No Frequency: # of Occurrences: Event No.: **Create Recurring Events**

Recurring

Event No.	Event Name	Final Reminder Due Date	Status
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Lists of Regulated Chemicals



Preloaded lists

User-defined lists

What Kinds of Reports?

- Lists of equipment & of materials/chemicals
- Materials Use &/or Non-Product Output *per unit of product, per equipment, per production unit, for entire facility*
- Materials Use - *incorporated into product vs. into non-product output*
- Various cost reports
- SEARCH window will enable searching by a variety of fields - output can be printed or saved to Excel

Example-Solid Waste

Waste Generated and Shipped Reports

Select Report:
Shipment Costs

Filter Report by:
 Site
 Site (with combined containers)
 Selected Product/Module Center:

Storage Date From: 00/00/0000 To: 00/00/0000
Clear Hazardous?:

10/28/2007 21:29:34 **Shipped Waste Report - Shipment Costs** Page 1 of 1

Waste Type	Net Weight	Internal Cost	External Cost	Total Cost
Cardboard	220	\$.00	\$.00	\$.00
	50	\$.00	\$.00	\$.00
	22	\$22.00	\$11.00	\$33.00
Total Weight For Waste Type: Cardboard	292	\$22.00	\$11.00	\$33.00

Example–Solid Waste

Waste Generated and Shipped Reports

Select Report: Chargeback Costs

Filter Report by:

- Site
- Site (with combined containers)
- Selected Product/Module Center:

Storage Date From: 00/00/0000 To: 00/00/0000

Hazardous?:

Clear

10/28/2007 21:28:52 **Shipped Waste Report - Chargeback Costs** Page 1 of 1

Waste Type	Shipped Net Weight	Chargeback Rate	Extended Cost
Cardboard			
	220	3.25	\$715.00
	50	3.25	\$162.50
	22	3.25	\$71.50
Total Weight For Waste Type: Cardboard	292		\$949.00
Oil			
	100	120	\$12,000.00
	2,200	120	\$264,000.00
Total Weight For Waste Type: Oil	2,300		\$276,000.00

Example—Chemical Usage

Chemical Usage Report

Find CAS No.:

From Date: 09-2007 To Date: 10-2007

Scope: All detail CAS Summary CAS / Material Summary

10/28/2007 **Chemical Usage Report From 09-2007 To 10-2007** Page 1 of 2

Note: All usage is in Lbs.

Chemical	Material	Chemical Usage Dept	Usage Date
10099-76-0	Lead Silicate		
	SPECIAL PAINT	Paint specific to Booths	
		Total for Paint specific to Booths:	35.55
		Total for Lead Silicate:	35.55
11120-22-2	Lead Silicate		
	GLIDDEN1	Glidden Eggshell Paint	
		Total for Glidden Eggshell Paint:	708.2795
		Total for Lead Silicate:	708.2795

User Flexibility

- **Two user levels**: basic & advanced
- Can have **multiple users**
- Can **start small or big** - for a single process or product line, or for the entire facility
- Can do **grouping**
 - ◆ Group individual pieces of equipment into "production units"
 - ◆ Group similar pieces of equipment into equipment "categories", e.g., paint booths

EMFACT Help Features

Cue Cards for EHS Object Setup

EQUIPMENT AND PRODUCTION UNIT QUESTIONS

EMFACT data can be tracked to the specific process equipment level or to a higher level group of process equipment called a "production unit" or to both levels.

Do you want to:

1. Add process equipment to the list or edit data for an existing process equipment?
2. Add production units to the list or edit data for an existing production unit?

AIR / WATER / WASTE INVENTORY QUESTIONS

Do you want to:

3. Add air emissions source (e.g. stacks) to the list or edit data for an existing air emission source?
4. Add water discharge points to the list or edit data for an existing water discharge point?
5. Add waste types used to categorize waste shipments to the list or edit data for an existing waste type?

"Cue-card" type menus will be provided for the basic user to guide them through a logical series of windows.

Assessment Information Management Procedure Guide

Auditor: Completing a General Assessment

General Assessments are usually done when there is not a specific checklist associated with the audit or for other internal/external audits. Sometimes, general assessments include initiating Corrective Action Requests (CARs) for nonconformances. The purpose of this guide is to outline the steps for documenting your general assessment findings in AIM. Please refer to procedure guide: The Issuer's Role in the CAR Process for detailed steps on initiating a CAR. Also, you may refer to the online training for more information on completing a general assessment.

1. Getting Started
Once you have performed your audit, you are ready to document your findings into AIM.
Access the AIM module in EHSdesk and:
1. Click the (Initiate) General Assessment button. The Initiate General Assessment window will open.
2. Entering Required Information
Complete the Assessment Event section as described below.
1. Click either EHS or Quality for the Assessing Org. Type.
2. Enter the date the assessment was performed in the Assessment Date field.
3. Make a selection from the Tier field; in most cases, it will default based on your commission level.
4. Review the Assessment Person field. It defaults to the person logged into EHSdesk, however, it can be changed if necessary.
5. Click either Internal, External or Supplier for the Assessment Origin field.
6. Click Save. A POP-UP box will appear with the assigned assessment number. Record the number for future reference.
7. Click OK. The Summary Maintenance for Assessment No. window will open.

AIM - General Assessment Procedure Flow

The Assessment Information Management (AIM) module of EHSdesk provides an integrated assessment management process and establishes a standardized format for all audits. General Assessments are created when there is not a specific checklist associated with the audit or for other internal/external audits. In addition, Corrective Action Requests (CARs) can be generated and tracked for each nonconformance. This procedure flow identifies the required fields for initiating and documenting your general audit findings in AIM and CAR (when a CAR is required). In some cases, recommendations are made on best practices. Please refer to procedure guide: Auditor: Completing a General Assessment, as well as the online training, for additional detailed instruction for documenting your general audit findings in AIM and CAR.

1. Auditor Initiates a General Assessment
Initiate General Assessment Window
Complete:
Assessment Event Section
 Assessing Org. Type
 Assessment Date
 Tier
 Assessment Person
 Assessment Origin
Click:
 Save
Record assessment number and click OK (when pop-up box appears).
2. Auditor Adds Content to Summary Maintenance for Assessment Window
Summary Maintenance for Assessment Window
This window contains 6 tabs. The tabs contained in these lists are optional; however, it is recommended that, at the very least, you do the following:
Complete:
Details tab
 Basis
 Type
 Scope
 Summary Description
CAR tab (if a nonconformance was found)
 Click the CAR button.
The Initiate Corrective Action Request window will open. Refer to procedure guide: The Issuer's Role in the CAR Process for detailed steps on initiating a CAR.
You may close and reopen the Summary Maintenance for Assessment window until all information is added and the audit is ready to be closed.
3. Auditor Closes Audit
Summary Maintenance for Assessment Window
Complete:
 Status (Click in the field and select Closed from the dropdown)
Click:
 Save

Other user documentation will include process flows & procedure guides.

EMFACT Development Status

- Development will continue for another 2-4 weeks
- Early (team) testing is ongoing
- Formal testing start target is November – includes pilot training at facilities
- Launch v1 in March 2008
(downloadable for free!)

For More Info...

<http://www.newmoa.org/prevention/emfact>

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